PHYSICS

BOOKS - TARGET PUBLICATION

CURRENT ELECTRICITY

Exercise

1. Choose the correct alternative

_____flow from the point of lower potentail to a point of higher potentail.

A. Electrons

B. Positive charges

C. Current

D. Protons

Answer: A

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2. Choose the correct alternative

When the resistance of the conductor increases then the current will _____.

A. increase

B. decrease

C. remain same

D. becomes double

Answer: B

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3. Choose the correct alternative

If the resistance in the circuit is increased by four times by keeping the potential difference

same, the current in the circuit becomes_____.

A. remains same

B. four times

C. one fourth

D. half

Answer: C

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4. Choose the correct alternative and write it along its allotted alphabet:

What will happen to the current passing through a resistor, if the potential difference across it is doubled and the resistance is halved?

A. remains unchanged

B. becomes doubled

C. becomes half

D. becomes four times

Answer: D

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5. Choose the correct alternative

Straight line is obtained on drawing the graph of current against potential difference. This proves _____.

A. Faraday's Law

B. Ohm's Law

C. Fleming's left hand rule

D. Maxweil's Law

Answer: B

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6. Choose the correct alternative

If two resistors of 10 Omega and 15 Omega are connected in parallel, then the equivalent resistance will be _____Omega.

A. 25

B. 150

C. $\frac{1}{6}$

D. 6

Answer: D

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7. Choose the correct alternative

If the effective resistance is to be decreased, then the number of resistors should be connected in _____.

A. parallel

B. series

C. mixed arrangement

D. none of the above

Answer: A

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8. Choose the correct alternative

Six resistors of 5a cach are connected in a

series combination. What will be the effective resistance in the circuit?

A. $\frac{1}{64}\Omega$

B. 3Ω

C. 2Ω

D. 64Ω

Answer: B

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9. Choose the correct alternative

_____wire is connected to a metal plate buried deep underground near the house and is used for safety purposes.

A. Live

B. Earth

C. Neutral

D. Fuse

Answer: B

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10. Complete the paragraph

Select the appropriate options and complete the following paragraph.

(neutral, earth, live, series, _ potential difference, parallel, 220 V, 110 V)

There are three types of wires used for domestic connections. The wire which is red or brown in colour through which current enters is called as_____ wire. The wire which is blue or black in colour through which current retums is called as_____ wire. The wire which is yellow

or green in colour and used for safety purposes is called as_____ wire. Various domestic appliances are connected in_____ combination so that_____ across every appliance remains the same. In India, the voltage difference between the live and neutral wires is about _____.

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11. Name the following

The difference between the values of two

different potentials

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12. Name the following

A flow of electrons through a conductor

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13. Name the following

The charge of one electron

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14. Name the following

Substances having very low resistance

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15. Name the following

Conductors which do not obey Ohm's law

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16. Name the following

A continuous path of an electric current through conducting wires connected to the two ends of a cell and other resistances

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17. Name the following

A two ended component having a given amount of resistance between its two ends

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18. True or False.

Work has to be done against the electric field to take a positive charge from a point of lower potential to a point of higher potential.

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19. True or False.

One coulomb current is said to flow in a . conductor, if one ampere charge flows through y it every second.

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20. True or False.

The unit of resistance is called ohm (Q).

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21. True or False.

Electric cell is used to apply a potential difference between two ends of a conductor.

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22. True or False.

The potential difference of a cell is caused by chemical reactions occurring inside the cell.

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23. True or False.

The free electrons in a conductor are the carriers of positive charge.

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24. True or False.

Resistivity is a specific property ofa material and different materials have different resistivity.

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25. True or False.

Ammeter is used to measure the potential difference in the circuit.

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26. True or False.

Those substances which have extremely high resistance are called insulators.

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27. True or False.

When resistors are connected in Series, the effective resistance is less than each of the individual resistances.

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28. Odd one out

coulomb, volt, ampere, charge.

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29. Odd one out

Rubber, Glass, Aluminium, Wood.

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30. Odd one out

Live wire, Fuse wire, Earth wire, Neutral wire,

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31. Complete the analogy

$1mV : 10^{-3}V : : 1\mu V :$ _ _ _ _ _ _.

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32. Complete the analogy

Electric current: _____::electric charge: column

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33. Complete the analogy

Ammeter: measures current :: _____measures potenial differce

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34. Complete the analogy

$$vo\ \frac{<}{a}\ mpera : ohm : : colum\frac{n}{\sec o}nd : \_\ \_\_\ \_\_$$

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35. Complete the analogy

Resistance in series: current is same :: Resistance in parallel:_____.

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36. Answer the following

Explain the concept of flow of electric current through a conducting wire, when potential difference is maintained between its two ends.

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37. Answer the following

Explain the mechanism of current flowing through a metalilic wire when connected to a cell or battery.

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38. What is the magnitude of charge on an electron?

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39. Answer the following

Classify the below units into units used to measure potential difference and electric current.

(volt, ampere, millivolt, microvolt, milliampere, microampere, column/sec, joule/sec).

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40. Answer the following

Define one ampere.

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41. Answer the following

Which units are preferred for measuring the

smaller values of current?

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42. Answer the following

When resistors are connected in series, they are connected one after another. If any one of them does not function, the circuit breaks and there is no flow of electricity. If two give less individually. If three bulbs are connected in series, their light output will decrease further.

Think about it: What is the reason behind this?

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43. Answer the following

Make a list of conductors and insulators you see around you.

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44. Answer the following

Which law is proved in the experiment of electric current, potentail difference and electric resistance? Explain it.

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45. Answer the following

What will be the effecct of change in the length and thickness of the eletrical wire in

the experiment of electric current , potentail difference and electric resistance?

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46. Answer the following question:

How will you prove that the unit of resistivity is $\Omega - m$?

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47. The resistance of a conductor of length x is r. If its area of cross section is a, what is its resistivity? What is its unit?

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48. Answer the following

Find the expression for the resistors connectred in series combination.

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49. Answer the following

What are super conductors?

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50. Answer the following

Find the expressionm for the resistors connected parallel combination.

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51. Answer the following

What happens to the effective resistance when individual resistance are connected in series and parallel?

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52. Answer the following question:

Three resistances x_1, x_2 and x_3 are connected in series in a circuit . X is the effective resistance. The properties observed

for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistance)

Current I flows through x_1, x_2 and x_3.

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53. Answer the following question:

Three resistances x_1, x_2 and x_3 are connected in a circuit in different ways. X is the effective resistance. The properties

oberved for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistacen)

x is larger than x_1, x_2 and x_3.

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54. Answer the following question:

Three resistances x_1, x_2 and x_3 are connected in a circuit in different ways. X is

the effective resistance. The properties oberved for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistacen)

x is smaller than x_1, x_2 and x_3.

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55. Answer the following question:

Three resistances x_1, x_2 and x_3 are

connected in a circuit in different ways. X is the effective resistance. The properties oberved for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistacen)

The potential difference across x_1, x_2 and x_3 is the same .

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56. Answer the following question:

Three resistances x_1, x_2 and x_3 are connected in a circuit in different ways. X is the effective resistance. The properties oberved for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistacen)

$x = x_1 + x_2 + x_3.$

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57. Answer the following question:

Three resistances x_1, x_2 and x_3 are connected in a circuit in different ways. X is the effective resistance. The properties oberved for these different ways of connecting x_1, x_2 and x_3 are given below. Write the way in which they are connected in each case.(I-current, V-potential difference, x-effective resistacen)

$$x = \frac{1}{\left(\frac{1}{x_1}\right) + \left(\frac{1}{x_2}\right) + \left(\frac{1}{x_2}\right)}$$

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58. Answer the following

State the difference between effective resistance, when resistors are connected in parallel and series.

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59. Answer the following

An electricia was connecting various dometic appliance at John's home. John asked him about the precautions to be taken while using

electricity. What all precautions would the electrician tell?

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60. Give reasons:

Potential difference produces a current in the circuit.

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61. Why are some substances are conductors while others are insulators?

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62. Give reasons:

Why can our body conduct electricity?

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63. Give reasons:

The material with low melting point is used for making fuse wire.

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64. Distinguish between potential difference and electric current.

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65. Distinguish between resistance in series and resistance in parallel.

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66. Questions based on paragraph

While performing an experiment on electric current, a student was given different electrical components such as conducting wires, ammeter, voltmeter, 9V_ battery, plug key, three identical resistors ($6\Omega, 6\Omega \text{ and } 6\Omega$).

How should the three resistors be connected to get the effective resistance of 18Ω?

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67. Questions based on paragraph

While performing an experiment on electric current, a student was given different electrical components such as conducting wires, ammeter, voltmeter, 9V_ battery, plug key, three identical resistors ($6\Omega, 6\Omega$ and 6Ω).

How should the three resistors be connected to get the effective resistance of 2Ω?

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68. Questions based on paragraph

While performing an experiment on electric current, a student was given different electrical components such as conducting wires, ammeter, voltmeter, 9V_ battery, plug key, three identical resistors ($6\Omega, 6\Omega \text{ and } 6\Omega$).

Which component will provide the potential difference in a circuit?

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69. Questions based on paragraph

While performing an experiment on electric current, a student was given different electrical components such as conducting wires, ammeter, voltmeter, 9V_ battery, plug key, three identical resistors ($6\Omega, 6\Omega$ and 6Ω).

Calculate the electric current, if all the resistors are connected in series.

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70. Questions based on paragraph

While performing an experiment on electric current, a student was given different electrical components such as conducting wires, ammeter, voltmeter, 9V_ battery, plug key, three identical resistors ($6\Omega, 6\Omega \text{ and } 6\Omega$).

Calculate the electric current, if all the resistors are connected in parallel.

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71. Umesh has two bulbs having resistances of 15Ω and 30Ω. He wants to connect them in ,a circuit, but if he connects them one at a time the filament gets burnt. Answer the following. What are the characteristics of this way of connecting the bulbs?

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72. Umesh has two bulbs having resistances of 15Ω and 30Ω. He wants to connect them in ,a circuit, but if he connects them one at a time the filament gets burnt. Answer the following. What will be the effective resistane in the above circuit?

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73. Solve the following examples (numerical problems):

If a charge of 420 C flows through a conducting wire in 5 minutes what is the value of the current?

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74. Acurrent of 0.4Aflowsthrough a conductor for 5minutes. How much charge would have passed through the conductor?

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75. A current of 0.24 A flows through a conductor when a potential difference of 24 V is applied between its two ends. What is its resistance?

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76. The resistance of the filament in a light bulb is 1000Ω. If the bulb is fed by a current from a source of potential difference 230 V, how much current will flow through it?

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77. Determine the current that will flow when a potential difference of 33 V is applied between two ends of an appliance having a resistance of 110Ω. If the same current is to flow through an appliance having a resistance of 500Ω, how much potential difference should be applied across its two ends?

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78. The length of a conducting wire is 50 cm and its radius is 0.5 mm. If its resistance is 30Ω what is the resistivity of its material?

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79. Determine the resistance of a copper wire having a length of 1 km and diameter of 0,5 mm. (Given: $\rho = Resistivity of copper = 1.7 \times 10^{-8}\Omega m$)

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80. The resistance of a 1m long nichrome wire is 6Ω. If we reduce the length of the wire to 70 cm, what will its resistance be?

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81. Three resistors having resistances of 15Ω, 3Ω and 4Ω are connected in series. What is the effective resistance in the circuit?

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82. Solve:

Two resistors having resistance of 16 and 14 are connected in series, if a potential difference of 18 V is applied across them, calculate the current flowing through the circuit and the potential difference across each individual resistor

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83. Resistors having resistances of 15Ω, 20Ω and 10Ω are connected in parallel. What is the effective resistance in the circuit?

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84. Three resistors having resistances of 5Ω, 10Ω and 30Ω are connected in parallel and a potential difference of 12 V is applied across them. Obtain the current flowing through the

circuit ang through individual resistors. What is the effective resistance in the circuit?

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85. When two resistors are connected in series, their effective resistance is 80Ω. When : they are connected in parallel, their effective resistance is 20Ω. What are the values of the two resistances?

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86. A current of 2 A flows through a conductor for 90 seconds. How much charge would have passed through the conductor?

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87. A current of 150 mA flows through a wire when the potential difference between its ends is 300 volt. Calculate the resistance of the wire,

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88. A charge of 30 C passes through a conductor for 2 minutes. Find the current flowing through the conductor.

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89. Resistance of a bulb is 500Ω. It is connected to a battery of potential difference 220 V. How much current will flow through it?

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90. Determine the current that will flow when a potential difference of 44 V is applied between two ends of an appliance having a resistance of 110Ω. If the same current is to flow through an appliance having a resistance of 600Ω, how much potential difference should be applied across its two ends?

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91. A copper wire of resistance 100 Q is connected to a battery of potential difference

25 V. What will be the current flowing through the wire? If the wire is replaced by aluminium wire, the current flowing through it decreases by 0.05 A. What is the resistance of aluminium wire used?

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92. The length of a conducting wire is 50 cm and its radius is 0.5 mm. If its resistance is 40Ω what is the resistivity of its material?

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93. Determine the resistance of a copper wire having, a length of 0.1 km and diameter of 0.5 mm.

[Given:

$Resistivityofcopper = 1.7 \times 10^{-8}\Omega m$]

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94. Three resistors having resistances of 12Ω, 9Ω, 4Ω and 3Ω are connected in series. What is the effective resistance in the circuit?

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95. Resistors having resistances of 8Ω, 6Ω and 12Ω are connected in parallel. What is the effective resistance in the circuit?

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96. Rohan took a conducting wire of length 30 cm and diameter 1.2 mm. After connecting to a power supply, Rohan found that the resistance

of the wire is 210Ω. What is the resistivity of its material?

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97. Three resistors having resistances of $3\Omega, 4\Omega$ and 6Ω are connected in parallel and a potential difference of 12 V is applied across them. Obtain the current flowing through the circuit and through individual resistors. What is the effective resistance in the circuit?

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98. The two resistors when connected together show maximum value of resistance as 160Ω , and minimum value of resistance as 40Ω. Determine the value of both the resistors.

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99. Answer the following question:

You must have seen a waterfull. Which way does the water flow?

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100. Using the internet find out about the different softwares used to solve mathematical problems and use them to solve problems given in this and other chapters.

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101. Solve the cross-word.

Across

2. A combination of resistances that reduces effective resistance of the circuit.

4. It is the rate of flow of charge.

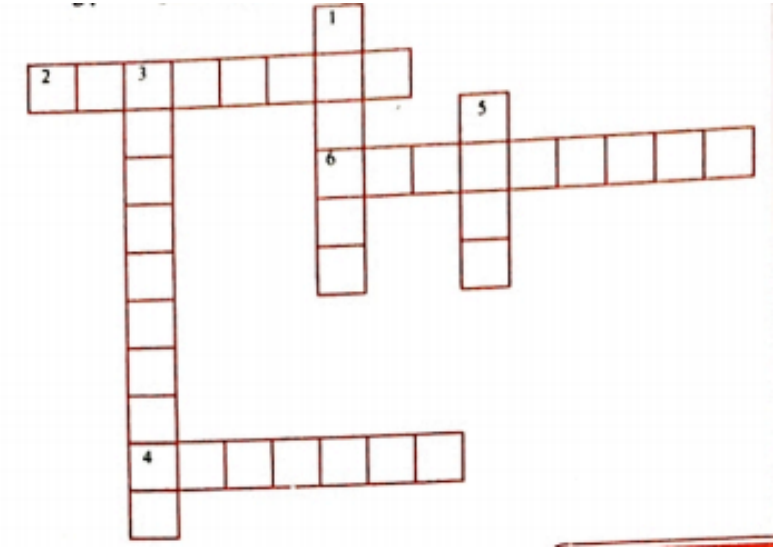
6. Substance which does not allow current to flow through it.

Down:

1. Combination of resistances in. which current flowing through all resistances is same.

3. Ratio of potential difference and current.

5. It is used to protect domestic appliances.



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102. Choose the correct alternative.

Resistivity of a wire of length L is p. Yash broke

this wire into two equal picces of length $\frac{L}{2}$ .The resistivity of each piece will be

A. ρ

B. 2ρ

C. $\frac{\rho}{2}$

D. $\frac{\rho}{4}$

Answer:

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103. Choose the correct alternative.

If the effective resistance is to be increased, then the number of resistors should be connected in

A. series

B. parallel

C. mixed arrangement

D. none of the above

Answer:

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104. Choose the correct alternative.

If three resistors, having values 2 ohm, 3 ohm and 4 ohm are connected in series, then effective resistance in a circuit will be _____ohm.

A. 6

B. 1

C. 9

D. 5

Answer:

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105. Choose the correct alternative.

In _____combination of resistors, the current is the same in every part of the circuit.

A. parallel

B. series

C. mixed arrangement

D. none of these

Answer:

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106. Answer the following.

Find the odd one out and justify your answer.

Resistor, Battery, Cell, Resistivity

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107. Answer the following.

Complete the given analogy.

Series combination : Effective resistance increases :: Parallel combination :_____

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108. Answer the following.

Match the columns.

	Column I		Column II
a.	Insulator	1.	Aluminium
b.	Conductor	2.	Paper
		3.	Silicon

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109. Answer the following.

Name the following.

A device used to measure current

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110. Give scientific reasons.

Why does a thick wire have low resistance?

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111. Give scientific reasons.

Fuse wire is made from the material with low melting point.

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112. Answer the following.

Give any four examples of conductors

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113. Answer the following.

The resistance of the filament of a bulb is 1500Ω. It is drawing current from a source of 230 V. How much current is flowing through it?

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114. Answer the following.

Distinguish between Resistances in series and parallel.

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115. Answer the following

Explain the concept of flow of electric current through a conducting wire, when potential difference is maintained between its two ends.

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116. Answer the following.

If the resistors 30Ω, 40Ω and 60Ω are connected in parallel to a battery of 15 V. then

find the effective resistance of circuit, the total current and current in each resistor .

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117. Answer the following.

Derive the expression for equivalent resistance in parallel combination.

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118. Answer the following.

Draw symbols of the following components.

Also state any one function of each.

Sr. No.	Component	Symbol	Function
a.	Resistance		
b.	Ammeter		
c.	Voltmeter		
d.	Closed key		
e.	Electric cell		

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